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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/728,245 | 12/04/2003 | Charles A. Gealer | P16923 | 7794 |

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BUCKLEY, MASCHOFF, TALWALKAR LLC
5 ELM STREET
NEW CANAAN, CT 06840

EXAMINER

IM, JUNGHWA M

ART UNIT PAPER NUMBER

2811

DATE MAILED: 07/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|---|--|
| Office Action Summary | Application No. 10/728,245 | Applicant(s) GEALER, CHARLES A. | |
| | Examiner Junghwa M. Im | Art Unit 2811 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3,4,11 and 14 is/are pending in the application.
- 4a) Of the above claim(s) 7-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3,4,11 and 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 12, 2006 has been entered.

Claim Objections

2. Claim 14 is objected to because of the following informalities: in claim 14, replace "the memory" with -- the double data rate memory -- for consistency.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 3 is rejected under 35 U.S.C. 102(b) as being anticipated by Mertol (US 5,940,271).

Regarding claim 3, Fig. 1 of Mertol shows an apparatus comprising:
an integrated circuit package (2);

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an integrated circuit die (1) coupled to the integrated circuit package;

a stiffener portion (11) coupled to the integrated circuit package and surrounding the integrated circuit die (col. 1, lines 31-32), wherein the stiffener portion and the integrated circuit package define a well in which the integrated circuit die is disposed;

a thermally-conductive material (6; encapsulant epoxy) disposed in the well and in contact with the stiffener portion and the integrated circuit die;

a thermally-conductive paste (7; adhesive epoxy) coupled to the stiffener portion and to the thermally conductive material; and

a heat sink (8) coupled to the thermally-conductive paste, wherein the thermally conductive material is disposed between the integrated circuit die and the heat sink, and wherein the thermally-conductive paste is disposed between the heat sink and the thermally-conductive material.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mertol in view of Mertol (US 5,909,056), hereinafter Mertol '056.

Regarding claim 4, Fig. 1 of Mertol shows most aspects of the instant invention except “underfill material disposed between the integrated circuit die and the integrated circuit package.” Fig. 3 of Mertol ‘056 shows a semiconductor device wherein underfill material (309) disposed between the integrated circuit die (311) and the integrated circuit package (306).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to incorporate the teachings of Mertol ‘056 into the device of Mertol in order to have a ball grid array IC in lieu of the wire-bonded IC for easier electrical connection. And underfill material needs to be disposed between the integrated circuit die (BGA chip) and the integrated circuit package to protect the bumps (electrodes) on the BGA chip.

7. Claims 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bhattacharyya (US 6,713,810) in view of Mertol.

Regarding claim 11, Fig. 12 of Bhattacharyya shows a system comprising:
a microprocessor (406) comprising an integrated circuit die; and
a double data rate memory (408; col. 15, lines 58-67) electrically coupled to the microprocessor.

Bhattacharyya, however, fails to show the specifics of the microprocessor such as “an integrated circuit package; an integrated circuit die coupled to the integrated circuit package; and a stiffener portion coupled to the integrated circuit package and surrounding the integrated circuit die, wherein the stiffener portion and the integrated circuit package define a well in which the integrated circuit die is disposed; a thermally-conductive material disposed in the well and in contact with the stiffener portion and the integrated circuit die; a thermally-conductive paste

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coupled to the stiffener portion and to the thermally conductive material; and a heat sink coupled to the thermally-conductive paste, wherein the thermally conductive material is disposed between the integrated circuit die and the heat sink, and wherein the thermally-conductive paste is disposed between the heat sink and the thermally-conductive material.”

Fig. 1 of Mertol shows an apparatus (a microprocessor) comprising:

an integrated circuit package (2);

an integrated circuit die (1) coupled to the integrated circuit package;

a stiffener portion (11) coupled to the integrated circuit package and surrounding the integrated circuit die (col. 1, lines 31-32), wherein the stiffener portion and the integrated circuit package define a well in which the integrated circuit die is disposed;

a thermally-conductive material (6; encapsulant epoxy) disposed in the well and in contact with the stiffener portion and the integrated circuit die;

a thermally-conductive paste (7; adhesive epoxy) coupled to the stiffener portion and to the thermally conductive material; and

a heat sink (8) coupled to the thermally-conductive paste, wherein the thermally conductive material is disposed between the integrated circuit die and the heat sink, and wherein the thermally-conductive paste is disposed between the heat sink and the thermally-conductive material.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to incorporate the teachings of Mertol into the system of Bhattacharyya in order to have the microprocessor comprising a heat sink, a stiffener, thermally-conductive material,

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thermally-conductive paste over the integrated circuit package in a manner recited in the instant invention to improve heat dissipation from the microprocessor during system processing.

Regarding claim 14, Fig. 12 of Bhattacharyya shows a system further comprising a motherboard (404) electrically coupled to the microprocessor and to the memory.

Response to Arguments

8. Applicant's arguments with respect to pending claims have been considered but are moot in view of the new ground(s) of rejection.

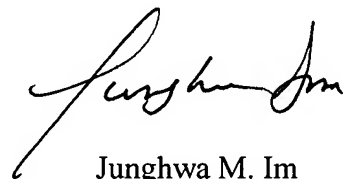
Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junghwa M. Im whose telephone number is (571) 272-1655. The examiner can normally be reached on MON.-FRI. 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

 7/20/2006

Junghwa M. Im
Examiner
Art Unit 2811

jmi